

THz frequency multiplier chains based on planar Schottky diodes

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Abstract

The Herschel Space Observatory (HSO), an ESA cornerstone mission, will incorporate complete solid-state frequency multiplier chains for use at 400 to 1900 GHz. This talk will focus on the development and current status of chains that are being developed for the two highest frequency bands, 1150-1240 GHz and 1400-1900 GHz.

State-of-the-art performance has been obtained from a three-stage multiplier chain that can provide a peak output of 80 μW at room temperature and a peak output power of 160 μW when cooled at 1110 GHz. Output power of more than 36 μW was measured from 1100 to 1190 GHz when the chain is operated at 120K (see Figure 1). The frequency multiplier chain is driven by power amplifiers at 100 GHz and is based on all planar GaAs Schottky diodes. A novel mechanism for mounting the chain to interface with the focusing optics has been designed and implemented. A detailed status of this multiplier chain along with relevant issues for space borne applications will be presented in this talk.

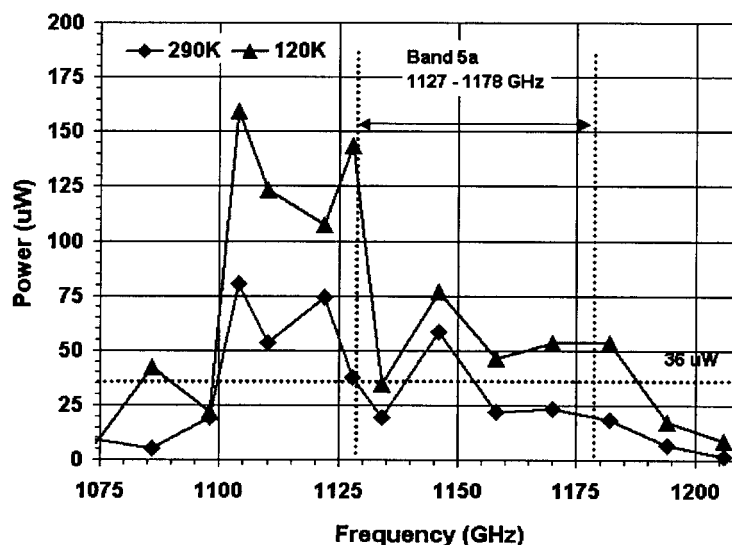


Figure 1: Preliminary measurement of an 1100 to 1200 GHz solid-state multiplier chain.